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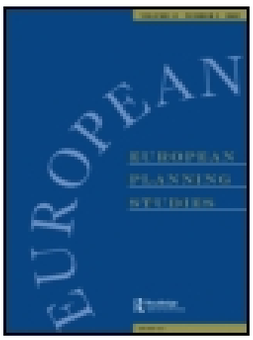
Municipalities as intermediaries for the design and local implementation of climate visions



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Municipalities as intermediaries for the design and local implementation of climate visions

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ABSTRACT

The transition to a sustainable society requires the development of visions paving the way for socio-technical changes. In recent years, the literature on sustainable transitions and urban planning has highlighted the intermediation role of municipalities to implement international and national goals and visions at a local level. Yet, empirical research studying municipalities from the lens of the intermediation theory are sparse. This paper aims at contributing to a better understanding of what strategies municipalities use when intermediating between and within different scales of governance (i.e. local, national and international), and what factors influence the choice of strategies. Through semi-structured interviews and document studies, three Swedish municipalities are studied. Results show that these municipalities translate the visions through local experiments, task delegation and coalitions. Additionally, the analysis indicates that the local circumstances, rather than the relations between the local level and the higher levels of governance or the guidance of national policies, influence the choice of intermediation strategy. Particularly, whether the management approach is centralized or decentralized, result- or process-oriented, participative or exclusive, is determinant. Results also indicate that municipalities perform both top-down and bottom-up intermediation, i.e. closing the loop from the local to the national and/or international levels.

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Municipalities; intermediation strategies; sustainable society; climate visions; management approach

1. Introduction

To reach a transition towards a more sustainable society, the development of visions paving the way for socio-technical changes is critical. Once developed, these visions need to be translated into local action. Authors have highlighted the strategic role of municipalities (which in this paper are limited to the local municipal administrative organizations) for the operationalization of national and international policies (Hodson & Marvin, 2009, 2012). Municipal administrations are constant local institutions, meaning that they can develop long-term strategies and could, therefore, be seen as anchor tenants of local sustainability efforts,

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particularly when it comes to efforts oriented towards a transition towards a more sustainable energy system. Indeed, in Sweden, many municipal administrations are both owners of local energy utilities and (through their role as public property owners) large energy consumers, which make them key stakeholders in energy and climate policy discussions and give them a significant opportunity to influence the local energy system and the sustainability performance of a significant share of the local housing market (Nilsson & Mårtensson, 2003; Palm, 2006; Sperling, Hvelplund, & Mathiesen, 2011). Compared with other actors (e.g. at the national level), municipalities also have specific competencies for the direct provision of services such as waste management, transport and sometimes energy services, as well as autonomy regarding land-use planning and education (Bulkeley, 2010). Finally, with the increased challenges associated with urbanization and with a need for the modernization and extension of infrastructure systems, there is an opportunity for municipalities to develop new practices and to lead the way in re-thinking planning, decision-making and governance (Fuenfschilling, Frantzeskaki, & Coenen, 2019).

Despite a strategic role in forwarding the transition towards sustainability, acting as intermediaries at the crossway between international, national and local visions and practices is complex. Previous literature has highlighted different approaches and factors affecting municipalities' choice of intermediation approaches (Fuenfschilling et al., 2019; Wolfram & Frantzeskaki, 2016). Nevertheless, we still lack empirical insights on how such intermediation is carried out or what factors influence municipalities' strategic choices in such processes.

Against this background, this paper aims *to understand how (Swedish) municipalities intermediate between national and/or international visions and the local context where visions will be implemented.*

This paper provides new contextual insights by performing a cross-case comparison of three Swedish municipalities of different sizes and governance styles and with varying levels of control over their local energy infrastructure. Sweden has been highlighted as an example of governance where the local and the national levels collaborate particularly well (e.g. Granberg & Elander, 2007; Gustavsson, Elander, & Lundmark, 2009). This, along with their local self-governance, means that the way municipalities handle climate policy differs quite significantly (Fenton, Gustafsson, Ivner, & Palm, 2015; Gustafsson, Ivner, & Palm, 2015; Schreurs, 2008). The guiding inquiry of the study was to understand the way Swedish municipalities contributed to the transition to renewable electricity sources, but, as further discussed in the methodology section of the paper, we realized rather quickly that renewable electricity was only one aspect among many in the municipalities' broader climate mitigation strategies.

Against this background, we formulated the following research questions, which will guide the discussion in this paper:

(1) How do Swedish municipalities intermediate between national/international climate visions and the local context?
(2) What affects the intermediation approaches chosen by Swedish municipalities?

2. Theoretical framework

This article has its roots in the technological transition and transition management approaches, which aim at understanding how societies and cultures continuously

reshape themselves in order to handle challenges such as climate change (Geels, Sovacool, Schwanen, & Sorrell, 2017; Rotmans, Kemp, & Van Asselt, 2001). One of the concerns raised in these literature strands relates to the issue of organizing sustainability transition, which is particularly complex because it involves interests, resources and actions from various spheres, e.g. the political sphere, consumers and producers, infrastructure holders, and technology developers (e.g. Kern & Smith, 2008).

In this context, the important role played by municipalities (or cities) at mediating between different interests and contexts has received major attention (e.g. Fuhr, Hickmann, & Kern, 2018; Hodson & Marvin, 2009, 2010; Wolfram & Frantzeskaki, 2016). In addition to the fact that they often control (parts of) the infrastructure in need for a transformation (Fuenfschilling et al., 2019), municipalities stand at the crossway between local, national and international levels of governance (Hodson & Marvin, 2009). They also have the ability and mandate to mediate between different stakeholders and interests, both at the local level and between the local, national and international levels (Hodson & Marvin, 2010).

In this theoretical framework, we integrate the transition and urban planning literature to set the theoretical foundation for the analysis of the findings. First, we introduce the three main strategies prevalent in the transition literature to operationalize national and/or international visions to the local context. Thereafter, we bring into play the urban planning literature to propose factors influencing municipalities' choice of intermediation strategies.

2.1. Intermediation between international/national visions and the local context – three different approaches

2.1.1. Task delegation

One strategy used by municipalities to translate international or national visions into local action is to delegate this task to other actors or agents. In particular, municipalities may either create new intermediary organizations or turn to existing ones to get support for operationalizing the municipal (and/or national/international) visions into concrete actions at a city scale (Hodson, Marvin, & Bulkeley, 2013). Such intermediaries can take the form of, e.g. a network (e.g. the Berlin Centre of Competence for Water in Moss (2009)), a partnership (e.g. the Climate Change Alliances in Horne and Moloney (2018)), a developer (e.g. Parks, 2019) or a municipally-owned company (e.g. the London Climate Change Agency in Hodson et al. (2013)).

Intermediaries play a crucial role in translating municipalities' visions, leveraging resources to implement these visions, creating consensus and committing actors to actions that can contribute to the visions (Hodson & Marvin, 2009). They play such a role by intermediating across different societal levels (e.g. from household to region and beyond), transcending geographical boundaries and by coordinating different interests from a large span of actors with opinions or stakes in the operationalization of the visions (Hodson & Marvin, 2009, 2012; Medd & Marvin, 2007; Moss, 2009).

Apart from intermediary actors, studies point to other actors, to which municipalities (more or less formally) delegate the responsibility to implement visions. For instance, Bulkeley and Kern (2006) explain that municipal governments can develop enabling modes of governing through which business and communities are encouraged to act for

the public purpose, i.e. on behalf of the municipal administrations. It should be noted that even if it serves the interests of municipalities to contribute to local actions against climate change, community involvement is not always formally initiated by municipalities. Examples such as the Transition Towns movement (Bulkeley, Broto, & Edwards, 2012) or of community initiatives to develop wind power projects in different European countries (e.g. Mignon & Rüdinger, 2016; Pesch, Spekkink, & Quist, 2019) illustrate how bottom-up initiatives can emerge which become part of the municipal operationalization of national/international visions.

2.1.2. Coalitions

A second strategy that can be used by municipalities to translate national and international visions to local is participation in or creation of coalitions. In order to access knowledge, resources, visibility or experiences needed to implement visions, municipalities sometimes choose to participate in international, national or regional networks, where they can interact with other municipalities (or their equivalents) (Bansard, Pattberg, & Widerberg, 2017; Kern & Bulkeley, 2009; Namyślak, 2014). Apart from sharing experiences and creating learning opportunities, such networks also have the potential to develop a common understanding of international visions or policies and to create coalitions among municipalities to influence the visions being developed at the national/international level (Kern & Bulkeley, 2009).

In addition to participating in networks with other municipalities, they implement visions through local participation. Such governance usually includes public actors, as well as businesses, citizens and civic society (e.g. Granberg & Elander, 2007; Gustavsson et al., 2009; Raven et al., 2017). These interactions can take place through local networks or hubs (Granberg & Elander, 2007). Through participatory governance, participants can express their opinions and perspectives, which means that different interests are considered and sometimes harmonized (Hodson & Marvin, 2009, 2012). This contributes to consensus and provides municipalities with access to a coalition of actors and to different networks and resources, who work towards common objectives and who can contribute to the local operationalization of national and international visions (Cuthill & Fien, 2005; Gustafsson et al., 2015).

2.1.3. Local experiments

Scholars have underlined the prominent role of municipalities in leading climate work using local experiments. In an analysis of 627 urban experiments aimed at addressing climate change all around the world, Bulkeley and Castán Broto (2013) found that local governments were leading 66% of them. In 50-case study of urban living labs across Europe, Kronsell and Mukhtar-Landgren (2018) showed that municipalities have the power to facilitate urban sustainability through experimental governance.

In contrast with other more traditional strategies chosen by municipalities, which rely on long-term comprehensive planning including targets, plans and policies, and are often associated with rather high requirements on institutional capacity and political economy, local experiments are initiatives and measures developed on a case-by-case and ad hoc basis (Bulkeley & Castán Broto, 2013). Local experiments most often involve business actors, communities, NGOs and/or other public organizations (Bulkeley & Castán Broto, 2013; Hodson & Marvin, 2007).

In the literature, local experiments are sometimes seen as motivated by potential profit, a way to cope with an existing or anticipated problem, a desire to expand authority and claims to resources, and/or a form of ideological expression (Hoffmann, 2011). In other cases, local experiments are seen as initiatives meant at destabilizing the established structures, which are determinant for sociotechnical changes and sustainability transitions (Raven, 2007; Smith, 2007), or as a way to operationalize the visions that are developed at a higher level of governance, e.g. by policy-makers (Evans, 2011). Local experiments may then be used by policy-makers as examples of policy implementation to inspire other municipalities, and as a means for the municipality initiating them to receive positive attention and gain political space (e.g. Gustavsson et al., 2009; Hodson & Marvin, 2007).

2.2. Factors influencing municipalities' choice of intermediation approach

Now that different strategies have been reviewed, the question of what factors determine or influence municipalities' intermediation approaches may be asked. Apart from selecting among (or combining) the strategies described above, previous studies have underlined that municipalities can be more or less committed, proactive or successful at implementing them (e.g. Bansard et al., 2017; Gustafsson et al., 2015; Gustavsson et al., 2009; Kern & Bulkeley, 2009). In this section, we introduce factors influencing strategies and approaches underlined in the literature.

2.2.1. Relations between the local level and higher levels of governance

Many studies stress the importance of the relation between the different governance levels as an important factor influencing municipalities' approaches to intermediate between visions and local actions (e.g. Raven et al., 2017). In particular, it matters if, e.g. national governmental bodies are controlling or delegating, i.e. leaving space for municipalities to implement the visions locally (Bulkeley, 2010). Such relations differ from one country to another. For instance, studies have reported that Sweden combines high national ambitions and strong local governments (Fenton et al., 2015; Granberg & Elander, 2007; Gustafsson et al., 2015; Gustavsson et al., 2009). In contrast, in countries such as China, where the political system is centralized, the local operationalization of visions is often strictly a response to central expectations and demands (Schreurs, 2008). In countries with federal governments, such as Germany and the United States, the mandate to environmental policy making and implementation is instead decentralized to the federal or state level (Schreurs, 2008).

As shown by Schreurs (2008), if the governance is centralized, alignment between, e.g. regional, national or international visions and the local interests is very important. In such circumstances, the municipality will have to adapt its approach so that it matches the vision, and the space for bottom-up initiatives will be limited. In contrast, if the governance is decentralized, there will be more space for initiatives and innovative solutions (Sperling et al., 2011). When ambitious goals and desires set at the national level are combined with the means and power to implement these goals at the local level, municipalities then have the capacity to act as the 'engines of change' needed to boost sustainability transition (Granberg & Elander, 2007; Nilsson & Mårtensson, 2003; Sperling et al., 2011).

It should be noted that the alignment of interests goes beyond the national/international and municipal dimensions. Even when municipal and national or international

interests are aligned, or even when governance is centralized and municipalities are autonomous in their way of implementing national or international visions, some challenges may occur if local actors, such as local businesses or inhabitants, have interests that are not aligned (Hodson & Marvin, 2010). This explains why, despite a decentralized governance and interests aligned between national and municipal interests, municipalities risk having limited success in their sustainability strategies (Gustavsson et al., 2009).

2.2.2. Guidance of national policies

Another factor influencing municipalities' approaches is related to the guidance provided by national policies. While consistent and stable policies can lead municipalities to dare taking more ambitious or long-term actions, a lack of stability and uncertainties in the national policy context, and a lack of attention towards climate work on the national level, may lead municipalities to prioritize other issues than sustainability (Bulkeley et al., 2012; Högström, Balfors, & Hammer, 2018; Rowe & Fudge, 2003).

There are also examples of municipalities that, when faced with inconsistent national policies or a lack of national ambitions about climate issues, have decided to pursue ambitious climate strategies despite a lack of national visions (and sometimes even against the national strategy). As suggested by Späth and Rohracher (2012), initiatives such as local projects and demonstrations have the potential to destabilize regimes and to show that variations in implementing national and international visions are possible. However, this requires access to strong networks and governance organized in a way that allows such an approach (Bulkeley, 2005; Späth & Rohracher, 2012). This is possible when municipalities have a strong local political leadership with interest in climate issues and when there is a consensus among local actors (Jörby, 2002; Späth & Rohracher, 2012).

2.2.3. Local circumstances

Another factor influencing municipalities' choice of intermediation strategies is access to financial resources and knowledge (Bulkeley et al., 2012). For instance, municipalities with low access to financial resources may not be able to afford to participate in networks, which may in turn limit access to knowledge, inspiration and even funding opportunities (Kern & Bulkeley, 2009). Some municipalities are dependent on national and/or international funding to undertake local experiments providing incentives and resources for large-scale climate action (Hickmann, 2017). Likewise, municipalities sometimes lack knowledge of how to negotiate contracts or put pressure on powerful private actors. Some also lack knowledge of energy and resource efficiency. This limits their ability to involve or delegate the tasks of implementing visions or developing local actions with other stakeholders (Moss, 2009).

Previous studies have emphasized that another determinant for the choice of intermediation approach is the municipal action space (e.g. Fuhr et al., 2018; Hodson & Marvin, 2010). Even if some municipalities have a direct influence (including ownership of infrastructure) on energy, water or sewage systems providing resources to the local citizens and organizations, in many countries the privatization and liberalization of infrastructures have resulted in limitations in their mandate and power. As a result, while municipalities with access to central infrastructures still have the mandate to choose or to combine different intermediation strategies, municipalities with no power over the infrastructure cannot decide which infrastructure investments should be made, which technologies

should be chosen, or which services should be offered (Moss, 2009). In the latter case, municipalities lack control over significant proportions of their emissions and are forced to negotiate and compromise with infrastructure owners (Gustavsson et al., 2009).

One last local circumstance affecting the intermediation approach is the local political leadership. Mayors and other key players with enough political authority and legitimacy can, together with a professional administration, push for a high commitment from the municipality and other local actors for innovative solutions or local targets going beyond the goals set at a national or international level (Fuhr et al., 2018; Hodson & Marvin, 2009; Schreurs, 2008). Indeed, as the example of London (and of Mayor Livingstone) illustrates, a strong political leader has the potential not only to push the municipality to successfully implement visions developed higher up in the levels of governance, but also to actually shape these visions by leading the municipality to act proactively and be a frontrunner in climate work (Hodson & Marvin, 2009).

3. Material and method

3.1. Case selection

This paper has a qualitative research design in which three municipalities situated in the same geographical region in the south-east of Sweden, i.e. Linköping, Norrköping and Åtvidaberg, were studied. The three municipalities were chosen because, together, they provide an interesting mix of contrasting and complementary features (see Table 1 for an overview).

First, Linköping and Norrköping have similar population and comparable size of municipal administrative organizations and number of municipal companies, and they have both received some attention for taking a leading role in climate work. In contrast,

Table 1. Some characteristics of the three municipalities in this study.

Characteristics	Linköping	Norrköping	Åtvidaberg
Number of inhabitants	158,520	140,927	11,631
Classification	**Large city** -municipalities with a population of at least 200,000 inhabitants and at least 200,000 inhabitants in the largest urban area	**Large city**-municipalities with a population of at least 200,000 inhabitants and at least 200,000 inhabitants in the largest urban area	**Commuting municipalities near medium-sized towns**-municipalities where more than 40% of the working population commute to work in a medium-sized town
Political management (as of 2014–2018)	Coalition of Swedish Social Democratic Party, Swedish Green Party and Liberals	Broad coalition of all parties (including Swedish Social Democratic Party, Centre Party, Liberals and Christian Democrats)	Coalition of Swedish Social Democratic Party and Moderate Party
Energy supplier	Municipally owned company	Privately owned company	Linköping municipal energy company
Year of the latest energy strategy	N/A	2017	2017
Municipal companies (which are 100% municipally owned)	10 companies, including1 energy company and 3 housing companies	12 companies including 1 water and sewage company and 2 housing companies	3 companies, including 1 water and sewage company

Sources: Statistics Sweden (2018), SALAR (2018)

Åtvidaberg is a smaller town with a smaller municipal administration and more limited resources, that has recently (in 2017) adopted both a new energy strategy and sustainability programme.

Second, all three municipalities have different types of energy supply. Linköping municipality has a municipally owned utility company (Tekniska Verken in Linköping), which also delivers energy to Åtvidaberg. Norrköping is supplied with energy by a privately-owned company.

Third, there are other related studies on Linköping's and Norrköping's approaches to energy strategies and the role of the municipality in forwarding sustainability to serve this study with valuable insights (see e.g. Fallde & Eklund, 2015; Fenton et al., 2015).

3.2. Data collection

The focus of the study was to explore and analyse the development of goals and strategies that contribute to a transformation of the energy system, focusing on investments in renewable electricity. This was done through documentation studies for each of the municipalities, followed by interviews with key actors (see Tables 2 and 3). In the first step of the data collection, the documents provided information about the municipalities' overall sustainability strategies.

After developing this general understanding of each municipality's approach to supporting the investments of renewable electricity, the documents were searched for information about drivers and obstacles to invest in renewable electricity and about policy directions for such investments. As Swedish municipalities have a high degree of self-governance, they have significant freedom to develop activities according to their local needs. This translates into different types of policy documents related to energy and sustainability. Nevertheless, three main types of documents were relevant for this study (see Table 2): energy strategies, overall environmental/sustainability programmes, and municipal ownership policy and guidelines to the municipal companies.

Semi-structured interviews complemented the documentation study. The interviewees were selected based on their involvement in the local sustainability management, on the potential impact of their functions in the transition to a more sustainable energy system, and on the extent to which they could be seen as a link between national energy policy and local action. In total, 16 interviews were performed with municipal informants (see Table 3).

Table 2. Overview of the documents selected for analysis.

Type of documentation	Linköping	Norrköping	Åtvidaberg
Energy strategy	N/A	Energy plan (2017) Action plan for old energy plan (2015)	Energy strategy (2017)
General environmental strategies	Environmental policy (2001), CO_2 neutral goal (2010), management system, climate vision (joint with Norrköping, 2008), municipal goals (2015–2018)	Municipal vision 2035, municipal goals 2015–2018, climate vision (joint with Linköping, 2008)	Sustainability programme (2017)
Ownership policy and guidelines (municipal companies)	Housing company Utility company	Water and sewage company Housing company	N/A

Table 3. Overview of the informants for this study.

Type of actor	Linköping (number of informants)	Norrköping (number of informants)	Åtvidaberg (number of informants)
Strategists with overall responsibility for the municipality's strategic energy management	Energy and climate strategist (1)	Energy controller (1)	Sustainability coordinator (1)
Energy/climate advisors	2	2	1
Representatives from municipal companies	Housing company (2) Energy company (1)	Housing companies (3) Water and sewage company (1) Event and real estate company (1)	N/A
Total	6	8	2

The strategists[1] were interviewed because they have an overview of the strategic energy and climate work in their respective municipality. All three municipalities had energy advisers; Linköping had two full-time energy advisers, while Norrköping had one and a half full-time and Åtvidaberg shared its energy adviser with another municipality. These were interviewed as they are one of the links between the municipality and the citizens and to some extent local businesses.

As both Norrköping and Linköping had delegated much of the sustainability and energy efforts to the municipally owned companies, representatives for these companies were key informants in how the local strategies were converted into action, and whether and how their sustainability and climate ambitions synchronized with the overall municipal ambitions. We focused on companies with a direct stake in the municipal sustainability work, either because they were the municipality's largest energy consumers (i.e. water and sewage companies, housing companies), because they had a significant possibility to invest in renewable electricity production (housing companies, real estate companies), or because they were responsible for energy supply (Tekniska Verken in Linköping).

All interviews were semi-structured to provide flexibility, but they all covered the following main themes:

- How the municipal sustainability management is organized
- Whether/how the municipality invests in renewable electricity
- Whether/how the municipality encourages other local actors to invest in renewable electricity
- Whether/how the municipality supports other local actors to invest in renewable electricity
- How the municipality collaborates with other (local, regional, national) actors concerning sustainability

The interviews were recorded and transcribed word for word.

3.3. Data analysis

After conducting the interviews and the first step of document analysis, the authors realized that the renewable energy strategy was managed as a part of the overall municipal climate or sustainability management. Therefore, as mentioned earlier in this paper, the

focus of the study was broadened to mirror the observed reality, as renewable electricity was just one among many aspects in their energy and climate strategies and that this also sometimes was part of the overall sustainability strategies. The results and discussions, therefore, have a broader scope as the documents and the informants focused mainly on the broader climate visions/strategies and actions and little on renewable electricity per se.

The data was analysed in two steps. First, each author studied the empirical material individually, i.e. the documentation and the interview transcripts, with the aim of identifying what characterizes each municipality, based on two themes: 'overall vision and strategy for sustainability' and 'operationalisation of the vision and strategy into local actions'. A joint discussion followed this first round of data analysis with the aim of complementing the picture formed independently and of forming a common understanding of each case.

Based on that understanding, a cross-case analysis was performed by the two authors together where differences and similarities between the cases were identified. Finally, the two authors went back to the data set to discuss and understand the factors explaining the differences and similarities between the cases.

4. Empirical findings

4.1. Overall vision and strategy for sustainability

4.1.1. Linköping

Linköping adopted a local Agenda 21 plan in 1997, and this can be seen as the start of an era of increasing activities towards a more sustainable city. Since then, Linköping municipality has adopted an environmental policy (in the early 2000s) and performed different types of climate mitigation projects within the framing of the Swedish climate investment programmes. In 2008, Linköping and Norrköping developed a joint climate vision, with the purpose to integrate climate-related aspects into all types of inter-municipal and intra-municipal planning (such as spatial planning, energy planning). It was also developed to encourage climate considerations into public procurement processes and communication. The development of the vision was part of a joint attempt to strengthen the climate efforts on a regional level, as climate issues require a broad approach.

In 2010, the Linköping municipal board decided to become a CO_2-neutral city by 2025. This goal was, although vaguely defined at the time, considered very ambitious and going beyond visions developed on the national level. Despite consensus in the political majority of the municipal board, no representatives from the municipal administration were involved in setting the goal. Hence, this goal came as a surprise to public officials. The interviews reveal that, even if it was appreciated to have such an ambitious goal, several of the interviewees doubted its potential to be realized as it was considered too vague, ambitious and unrealistic. Furthermore, as it was not communicated within the municipal organization, there were difficulties in clearly formalising the scope of its operationalization. Although the CO_2-neutrality goal now appears to be what guides most of the municipality's actions and strategies, it had not yet (in 2017) resulted in any formal action plan. At first, it was decided that the goal should cover the geographic boundaries of the municipality including its actors. Nevertheless, this scope is now under scrutinization, since the goal appears difficult to reach, given its width and for partly being beyond the municipality's action space.

4.1.2. Norrköping

Apart from the joint climate vision developed with Linköping in 2008, Norrköping had a goal of becoming fossil-free by 2030. The municipality had an energy plan guiding its local energy and climate efforts; in 2017, however, finding the current energy plan from 2009 too complex, the municipal board decided revise it to simplify the message and make it easier to communicate internally (in the municipal administration and its municipal companies) and externally (e.g. citizens and companies). According to the documentation, the plan has its roots in the laws on municipal energy planning and energy audit of large companies (which also applies to municipality-owned companies). It also acknowledges the UN sustainable development goals (SDGs) and the Paris agreement. According to the plan, by 2030, the consumed energy will be reduced by 30 percent compared to 2005, and only renewable electricity sources will be used. Apart from clear goals and monitoring indicators, the energy plan also formally established what responsibilities should be undertaken by the municipal organization (in contrast to other local actors) and what limitations define the scope of the plan (i.e. the plan covers the geographic boundaries of the municipality, the transport sector is included in the goal except for the maritime and air transport). The energy plan is complemented with a local action plan, where responsibilities and actions are dedicated to the respective municipal administration units (e.g. the IT unit or the local planning unit) and municipal companies. In the local action plan, also formalized is how and when the actions will be monitored.

4.1.3. Åtvidaberg

Through a participative process involving around 300 municipal employees from all units of the municipal administration in 19 workshops, Åtvidaberg developed a new energy strategy as well as sustainability programme strategy, both valid from 2017 to 2020. The energy strategy included goals on reduction of GHG emissions, energy efficiency and increased use of renewable energy, which were to be applied to all actors within the municipality's geographic limits, and the sustainability programme had specific goals for the municipal internal sustainability management. While the goals applying to the geographic borders of the municipality were mainly designed to follow the national goals, the goals aimed at the municipal organization were locally defined. The energy strategy was operationalized following the structure of the UN SDGs and, according to our informants, was meant to enhance the communication with local stakeholders. The energy strategy indicated how the goals would be monitored and how the responsibility for the different goals was delegated. The local sustainability programme designed with departure from the SDGs received attention on the national level, e.g. from the national government and the Swedish Association of Local Authorities and Regions, as it was seen as an innovative way of integrating the goals into practice. According to the informants, this created an excellent opportunity for the municipality to profile itself as a role model, to show that it is possible to work with sustainability despite limited resources.

4.2. Operationalization of the vision and strategy into local actions

4.2.1. Linköping

In Linköping, despite the lack of a formal action plan, our interviews showed that the municipality had two main strategies to achieve their CO_2-neutrality goal. First, they

had an internal approach by reducing the municipal organization's CO_2 emissions, e.g. energy efficiency in buildings and rental apartments, and by compensating for its current CO_2 emissions, e.g. investments in renewable electricity production. Second, they used an external approach by encouraging other local actors, e.g. local citizens, businesses and associations, to invest in more energy-efficient solutions or cleaner technologies, as well as to promote behavioural changes related to CO_2-emitting activities.

In their internal approach, Linköping worked towards CO_2 neutrality mainly by delegating the operational responsibility to the municipal companies. The ownership policy and guidelines provided to all municipal companies in Linköping include requirements concerning contributing to the operationalization of the CO_2-neutrality goal, financial liquidity and the provision of a share of the returns to the owner. While liquidity and economic return requirements were quantified for each company, there was no formal target regarding how much each company must contribute to the CO_2-neutrality goal. Even if each company received concrete directions, which, according to our interview with the municipal energy company, were treated 'as a law', they also had a mandate to develop their own ambitions. Hence, Linköping municipal companies were rather free to decide how to implement the owner's directives, as long as they fulfilled the requirements. For instance, the municipal energy company had set its own goal to eliminate the use of coal and fossil oil in its electricity production by 2020. The municipal housing company had taken on responsibilities that go beyond the ambitions in the municipal ownership policy and guidelines by developing its own energy strategy. The municipal companies mentioned several times during the interviews that they even used the ownership policy and guidelines as a means to legitimatize more ambitious and controversial investments in technology for renewable energy and experiments that have the potential to contribute to resource efficiency but that are not profitable in the short term. The housing company invested in wind and solar power, as a way to become electricity self-sufficient and to increase the company's environmental profile.

As for the external approach, Linköping focused on facilitation to encourage citizens and others to adopt more sustainable behaviour. Examples of such activities are information, education and advising, and creating coalitions and networks aiming at encouraging change. The local energy advisors were important in this strategy. They had the freedom to take their own initiatives, such as organizing seminars on solar power aimed at home owners or housing associations or advising about energy efficiency targeted at local companies, as long as fulfilling the rather limited requirements issued by the Swedish Energy Agency. Yet, the fact that the municipality had to submit an application to the Swedish Energy Agency every two years to receive funding for the climate advisers was perceived as creating a high level of uncertainty, stress and a lack of stability, which is needed for long-term strategies.

In order to commit actors responsible for a rather large share of the local CO_2 emissions to contribute to local climate efforts, Linköping municipality had also initiated a network where the seven largest local companies can interact, learn and exchange experiences with a focus on sustainability. Moreover, Linköping municipal energy company contributes to the European policy level as well as to the national research agenda for renewable energy through participating in a group which represents the interests of Swedish energy producers at the European Parliament and takes part in the committee deciding over national funding for research projects within the field of energy.

4.2.2. Norrköping

To reach its sustainability goals, Norrköping, like Linköping, had both an internal strategy, including the municipal administration and the municipal companies, and an external strategy, incorporating inspiring, advising and encouraging local actors, such as enterprises and citizens.

Norrköping had a clearly demarcated steering model, which guided and controlled the municipal organization's activities. It uses a model built on basic management principles such as standardization and feedback loops. Concretely, this meant that the municipal vision was based on planning preconditions, i.e. where the organization identified its current situation and performance, and on current societal trends that needed to be addressed. This constituted the foundation for the municipal budget and goals, which guided the politicians' and the public officials' operational plans and activities towards the vision. The follow-up consisted of quality reporting, internal management and control, and was presented in annual reports.

Similar to Linköping, Norrköping had developed a concrete owner policy and guidelines for the municipal companies including mission and role definitions, liquidity requirements, and a certain share of yield requirements to the owner, along with the responsibility to reduce the company's environmental impact. In contrast to Linköping, where owner policy and guidelines were used as a way to define the mandate of the municipal companies, the interviews in Norrköping indicate that these were mainly used as a way to define the assignments and duties to be performed by the municipal companies. From our interviews with the municipal companies in Norrköping, it also emerged that even if municipal companies are formally allowed to make investment decisions, such as in renewable electricity technology, the decision-making was centralized at the municipal administration level. For instance, the municipal companies or units of the municipal administration that were the largest electricity users had been assigned to evaluate the potential for municipal wind power ownership. Rather than evaluating and making their own decision about potential wind power ownership (as Linköping's housing company has done it), these organizations were instead expected to develop a report which would constitute the basis for a municipal council decision. Moreover, none of the municipal companies in our sample had their own energy and/or climate strategy. Instead, when asked about it, they referred to the municipal goals.

A mechanism used by Norrköping was so-called green bonds (which is an externally funded EU initiative) to promote sustainable investments. Municipal companies and units of the municipal administration were encouraged to develop investment proposals for projects aimed at climate action. Eligible projects include investments in renewable energy, energy efficiency improvements in existing buildings, investments in sustainable public and individual transportation, or waste management. Project proposals were first screened by a group of energy specialists from both municipal companies and municipal administration. After the initial screening, the environmental controller and the municipal financial unit (both at the municipal administration level) made a decision on which projects would be funded by the municipality, through issuing green bonds.

Regarding the external approach, while both Linköping and Norrköping recognized that local actors cannot be forced but rather encouraged and inspired to contribute to the municipal goals, Norrköping had chosen another strategy compared to Linköping by focusing its efforts on developing municipal directives (e.g. a checklist for the

organization of more sustainable events, a directive for the use of chemicals and a guideline for sustainable consumption) and at dialoguing with local actors in order to commit to these. Similarly, rather than initiating networks or creating platforms for local actors, Norrköping instead participated and sponsored networks developed and initiated by others. For instance, the municipality was part of the network 'a fossil-free Sweden' initiated by the county council and a local environment network organized as an independent network gathering local companies and organizations around environmental issues and initiatives. The energy advisors in Norrköping focused on informing, inspiring and advising other types of groups, e.g. pre-school children, home and property owners, farmers, small businesses or associations. Even if, like in Linköping, these advisors are rather free to initiate activities, in Norrköping, their work was monitored on a more regular basis, and they were also given some assignments from the municipal administration, e.g. statistical reports (in addition to the Swedish Energy Agency's requirements).

4.2.3. Åtvidaberg

Since the energy strategy and the sustainability programme were new in Åtvidaberg, it is rather difficult to analyse how these are being operationalized. Nevertheless, based on the interviews with the municipal sustainability strategist and the local climate and energy adviser, as well as from the strategy, it is possible to see that the main focus to contribute to its goals was on the internal approach. In particular, the management approach consisted of making sure that all employees felt involved and committed to the work towards a more sustainable municipality. As mentioned in Section 4.1.3, many municipal employees were involved, and all units of the municipal administration were encouraged to evaluate their current efforts with regard to energy efficiency, renewable electricity or sustainable transport, as well as to set new goals for 2020. As a result, a consensus had been found where the future actions will include a renewal of the vehicle fleet to only have vehicles driven on fossil-free fuel, energy reduction in municipal buildings (i.e. a decrease of 20% of energy use in 2020 compared with 2008) and a 100% renewable electricity use by 2020 (e.g. through a larger share of renewable electricity purchased and investments in solar power on municipal buildings). Even though Åtvidaberg did not have a municipally owned energy company, there are municipally owned waste management and water and sewage companies. However, neither the strategy nor the sustainability programme mentioned the potential role of the municipal companies in reaching the municipal goals.

While it mainly has an internal approach, there were still a few activities being organized to encourage and inspire other actors, e.g. information campaigns, advise and support targeted at local companies and farmers, and education in schools. This was led by the local climate and energy advisor. Additionally, collaborations between local actors (e.g. schools and companies) as well as between the local climate and energy advisor and other supporting organizations, such as the association of Swedish farmers or the local Church, seemed to be important. Finally, the strategy mentioned the importance of developing municipal infrastructure aimed at facilitating a more sustainable lifestyle, for instance, the installation of charging stations for electric vehicles and the creation of additional biking paths.

5. Analysis and discussion

In this section, we reflect on our findings from the three municipalities concerning the two research questions that have been guiding our study. The analysis is then summed up in Table 4 to visualize the municipalities' intermediation strategies and their potential implications.

5.1. Intermediation strategies

Linköping intermediates through task delegation (as discussed by, e.g. Hodson et al., 2013) to the municipal companies, and these have a high degree of freedom to develop their own approaches. This has, in the Linköping case, often led to that the municipal companies being more ambitious and proactive than required by the ownership policies. One example is the local solar and wind power experiments by the housing company. As discussed earlier in this paper, there are different motivators for local experimentation (Bulkeley & Castán Broto, 2013; Hoffmann, 2011) and in the case of Linköping, the local experimentation seemed to be driven as a form of ideological expression and also opportunity to set Linköping on the sustainability map. This type of experimentation, which is one important way of striving towards local sustainability, is, however, also depending on local capacity, political will, resources (i.e. both financial and knowledge-based), scope (i.e. organizational contexts) and mandate (Fenton, 2016).

Coalitions occur in all three municipalities; however, it seemed to be more important in Norrköping and Åtvidaberg, which are dependent on other actors for their energy supply. In that sense, they have a smaller action space compared to Linköping. They need to collaborate with other local actors in a governance setting to build a joint approach with other local actors to convert international and national visions into local practice (Cuthill &

Table 4. Summary of the municipalities' intermediation strategies, determining factors and potential implications.

Municipality	Strategies	Determining factors	Pros and cons
Linköping	Task delegation Local experiments Coalitions	Local circumstances (access to municipal energy companies, access to financial resources, management approach)	+Space for initiatives and creativity +Broad commitment −Resource inefficiency −Risk for organizational confusion −Risk of not being able to achieve goals
Norrköping	Coalitions Local experiments (with limited ambitions and a strong focus on goal achievement)	Local circumstances (no municipal energy company, management approach, guidance of national policies)	+Efficient +Good chance for goal achievement −Lack of commitment and initiatives −Lack of context-specific goals and actions
Åtvidaberg	Coalitions (participative process)	Local circumstances (no municipal energy company, limited access to financial resources, management approach) Guidance of global policies	+Legitimacy +Broad commitment −Lack of resources −Vulnerable approach relying on the commitment of a few individuals −Individual-dependent

Fien, 2005; Gustafsson et al., 2015). All the studied municipalities felt the need to network with others. This was to get access to resources (Bansard et al., 2017) and have an impact on others, such as national policy makers (Kern & Bulkeley, 2009). All municipalities in our study were part of different municipal and regional networks in which they exchange experiences with other municipalities and organizations. Some of these networks were formed to develop a joint effort towards influencing national policy making. For instance, Linköping teams up with other municipalities to answer remittances from the national government on energy and climate issues. Linköping also uses its municipal companies to influence branch-specific policies and organizations. Through these networks, the municipality can build up its capabilities, share and receive information about good and bad praxis related to climate initiatives, and build upon its profile to be recognized as a forerunner regarding climate and energy issues.

Participating in networks and trying to influence national (and international) policy making, as is done in Linköping, could be seen as one way of overcoming some of the challenges that municipal administrations have, as they must address both national and international policies in their local arena at the same time as balancing different local interests and preserving the environment. There are also other ways to influence and inspire others, both local and national organizations, as in the case of Åtvidaberg, where their approach to their energy strategy and sustainability programmes has attracted a lot of attention due to its creativity departing from the SDGs. Good practice, which could influence others, is not to be underestimated in the transition towards a more sustainable energy system.

5.2. Factors influencing the choice of intermediation approach

5.2.1. Relations between the local level and the higher levels of governance

Our results stress that it is not only the governance at the national level but also at the local level, as well as the municipal managerial approach, that influence the choice of intermediation approach. This explains why, as underlined by previous literature intermediation (e.g. Bulkeley et al., 2012; Hodson & Marvin, 2010), different municipalities have different approaches to intermediation. The fact that Swedish municipalities have a high level of self-governance and thereby can decide how to translate the international and national climate visions into local practice of course also influences their having different approaches (Fenton et al., 2015; Granberg & Elander, 2007). Hence, we could see that the studied municipalities' strategies and approaches were aligned with and guided by national visions/ambitions, but in this paper, we have illustrated some examples of where the local ambitions exceed the national ones. In our cases, we can see that the national and international visions indeed impact the frame of action of Norrköping and Åtvidaberg. Norrköping expresses an ambition in its energy strategy to follow the goals of the national and (to some extent) international visions, while Åtvidaberg, in contrast, clearly integrates the global policy for sustainability in its local strategies for energy and sustainability. For the case of Linköping, however, the national vision seems to have had a more limited impact. The case of Linköping indicates that even in contexts where national policies are consistent and national ambitions are high, local governments can decide to act proactively and with higher ambitions than the national ones. Nevertheless, as indicated in the literature (Jörby, 2002; Späth & Rohracher, 2012), such an approach indeed requires strong political leadership (e.g. Fuhr et al., 2018).

Apart from being influenced by national and international policies, we could also see that some municipalities also act as bottom-up intermediaries as they provide feedback to the national and to some extent international policy-making level on how national/international strategies should be developed, what type of support they need, etc. In that sense, there is a positive feedback loop in which the municipalities contribute to the national/international agenda-setting. This is in line with what has recently been underlined by, e.g. Fuenfschilling et al. (2019), where the authors stressed that initiatives taken at the urban level have the potential to lead to institutional change. Nevertheless, it should be noted that in our study, e.g. the case of Linköping, national and international policies conflict with local priorities, when, e.g. tax exemptions for small-scale renewable electricity production plants (applying to legal persons or organizations rather than plants) hamper the investment opportunities for Linköping's housing company.

5.2.2. Local circumstances

In this study, as previously suggested, we have seen that the local circumstances in terms of resources, scope of action and political leadership have had an important impact on the studied municipalities' approaches to intermediation Access to resources is a key factor. Linköping and Norrköping have relatively large organizations, meaning that they have the size and resources to fund local experiments and to employ specialists to forward climate action. Instead, Åtvidaberg, which in this context is a small municipality, has to collaborate with other actors in networks and coalitions to achieve its sustainability ambitions and to overcome its relative lack of action space related to resources. Although there is a risk that the municipality becomes dependent on other actors, such cross-sectoral collaboration is a precondition for sustainability and, as discussed by, e.g. Cuthill and Fien (2005) and Gustafsson et al. (2015), it contributes to a broader understanding and engagement for local sustainability action. Having broad participation when developing the new energy strategy in Åtvidaberg was an important means of being able to achieve its goals. This type of approach could pave the way for a more legitimate process, where both internal management and external efforts towards sustainability goals and the transition towards a more sustainable energy system are included (Palm & Thoresson, 2014). However, there is a risk that climate action work in smaller municipalities such as Åtvidaberg with minimal resources becomes very individual-dependent and vulnerable from a long-term perspective.

Another important aspect that influences the municipalities' intermediation approaches is their scope of action. In Linköping, leadership and experiments can be conducted by the municipal energy company, hence allowing the possibility for bottom-up policy making and also for a more proactive approach to climate actions. Municipally owned companies play an important role, as they can act as system builders and have a high impact on the development and sustainability performance of the local energy system (Fallde & Eklund, 2015). The level of commitment could be questioned in the Linköping political leadership, as the CO_2 goal is perceived by the public officials as unrealistic and since its operationalization is poor. Narrowing down the scope of the goals from the geographical area to focus more on the internal organization is another aspect that could contribute to questioning the seriousness of the goal. It could also lead to important aspects getting lost, since the local climate action needs to be a joint effort between many actors. Many other municipalities do the opposite compared to Linköping as they

start to get their own house in order and work internally before broadening the scope to the geographic area (Emilsson, 2005). We believe it is important to have both approaches, i.e. working both internally and externally.

Norrköping and Åtvidaberg, are depending on other external actors for their energy supply and have little scope of action in-house. The management approaches in our cases range from Norrköping, having a centralized organization with a defined steering model guiding all activities and policies, to Linköping, which has a decentralized organization with relatively low formalization and a rather undefined management model. The organization of Åtvidaberg, with a top-down, quite formalized approach and a participative governance, is somewhere in-between Linköping and Norrköping in this sense. As the results indicate, having a decentralized or centralized approach has both advantages and disadvantages (e.g. Brafman & Beckstrom, 2006).

One positive aspect of a centralized formalized and process-oriented approach, such as in Norrköping, is that priorities are clear and that the goals are likely to be achieved. It may also be easier to involve employees as well as external actors since the work procedures are standardized and predictable. However, our results also show that there are a number of drawbacks with this approach. First, this study suggests that bottom-up initiatives and commitment are impeded since most initiatives have to be monitored and approved at a high organizational level. Second, in the interviews conducted in Norrköping, we observed that the municipal companies referred to the steering model when discussing sustainability ambitions and saw the municipally set goals as the ultimate ambition level. This indicates that with such an approach, little space is left for reflecting on how to develop context-specific strategies and for local experimentation. Third, there is a risk due to the dependence of funding for initiatives to take off (Schreurs, 2008), as in the green bond initiative in Norrköping. This funding is provided for a limited time, and it is uncertain what will happen after this initiative has come to an end. Hence, this study emphasizes that, as suggested by, e.g. Fuhr et al. (2018), municipalities' action space and their way of intermediation are interdependent.

With a decentralized bottom-up and result-oriented management approach, such as in Linköping, there is a larger action space for local actors, which enhances creativity and innovation. As the results indicate, Linköping municipality combines a rather undefined steering model with a clearly communicated goal of becoming CO_2 neutral. In other words, there is a clear and ambitious goal combined with a lack of a roadmap. This can be seen as an opportunity to motivate higher sustainability ambitions and investments to meet the local expectations. The risk, however, is the occurrence of organizational confusion, where different departments and companies interpret the goal differently and strive in different directions, leading to a lack of goal achievement (Brafman & Beckstrom, 2006). In such context, Linköping clearly benefits from having access to its municipal companies where visions, initiatives and guidelines supporting the achievement of the goal can be developed, and where experiments can be conducted allowing for bottom-up policy making.

A participative approach, such as in Åtvidaberg, where both internal and external actors are involved in the development, also has its pros and cons. Indeed, building local coalitions to achieve the climate ambitions may be seen as a good way to achieve a more legitimate process where both the internal management and external efforts towards goal achievement are included (Palm & Thoresson, 2014). Through this

participative process, it may be easier for all involved actors to understand the challenges, problems and how they are relevant in different contexts, which could overcome common criticism of planning institutions being too influential and powerful (e.g. Hare, Letcher, & Jakeman, 2003). However, due to very limited resources combined with having little influence on the energy supply (as there is no municipally owned energy company), this implies a limited action space when it comes to energy-related issues. This puts significant emphasis on the municipal sustainability and energy strategists to forward the process, and risks being very individual-dependent and vulnerable in the long run.

6. Conclusion

All municipalities in this study use a mix of different intermediation strategies. They all use coalitions; however, this approach seems more important in Norrköping and Åtvidaberg since they do not have municipally owned energy companies. Linköping has a broader scope of action having its own energy company, and it has, to a greater extent than the others, used task delegation for intermediation. Local experiments are most frequently used in Linköping, where the municipally owned companies take initiatives to test new ideas to contribute to the fulfilment of the CO_2 neutrality goal.

When it comes to factors that influence the intermediation approach, we can conclude that local circumstances in terms of organizational management approaches are the most important. How sustainability management is organized is dependent on the overall management structure of the municipal organization.

As mentioned earlier, Swedish municipalities are rare in the sense that they have a high degree of autonomy, and this could be one reason for why local circumstances seem to be the most important factor for the choice of intermediation strategy – there is considerable freedom locally to develop local strategies and practice. This could also be one reason why national and international policies are guiding rather than forming local sustainability efforts in Swedish municipalities. This study is limited to three Swedish municipalities, and to test and generalize our conclusions there is a need to perform studies with a bigger sample and comparative studies with municipalities in other countries with different preconditions and local contexts.

Note

1. These actors were labelled differently in the different municipal administrations depending on their tasks and responsibilities.

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